

end of the book is better thought out, and will suffice for the needs of a popular work.

A characteristic of the book to which we must take serious exception is the frequent omission of references to passages on which Mr. Day bases his deductions. It is not enough to say "suicide was not discountenanced" (p. 172); if the statement is to be fully accredited, all the arguments, with chapter and verse, should be given in full. Moreover, we cannot congratulate Mr. Day on his attempt to provide us with a translation superior to that of the Authorised Version of the words '*āsereth d'bhārīm*, or of I. Sam. ii. 8; the former he renders by "the Ten Words," a most infelicitous choice of the meanings of *dābhār* open to him, while the latter is translated "He taketh the needy from the city-dump" (p. 144); surely the old English word "dunghill" is not too outspoken for a popular book? Again, we must protest against such barbarisms as "pled" for "pleaded" (p. 28); "demonic" for "demoniac" (p. 56); "a few nearby men" (p. 62); and "he was the power back of nature" (p. 88); or such a hybrid as "David ben Jesse" (p. 63). We could wish, too, that Mr. Day's thirst after "local colour" (p. 225) had not led him to describe Samson as "being peculiarly susceptible to female charms" (p. 53); or his labours as "deeds of a purely personal character, in which a man of great strength got a little needed exercise, and at the same time revenged himself upon his personal enemies" (p. 66); or to refer to the rich of Samaria as "wealthy nabobs" (p. 102). The use of modern colloquialisms is unpardonable in all descriptions of Biblical events, challenging, as they do, the classic English of the Authorised Version. What can be said in defence of the following: "It is probable that the star-gazing of the society belles of Jerusalem, a Babylonian importation, was, like similar attempts to acclimate (?) foreign cults, in the nature of a fad, as was charioteering in the capital in the days of Absalom and Adonijah" (p. 116), or, "It was a long way . . . from the city-dump to a seat among the nobles of the land; but Yahweh knew the way" (p. 151)? Moreover, we are not by any means convinced that the "modern picnic" (p. 45) is the survival of the ancient sacrificial feast, even with the limitation "though seldom of such an exclusive character." It is a great pity that Mr. Day has thought fit to include such colloquialisms as the above in a work on which he has evidently spent time and care. We think, however, that he has not made the most of his opportunities.

#### OUR BOOK SHELF.

*The Table of British Strata.* By Dr. H. Woodward and Mr. H. B. Woodward. (London: Dulau and Co., 1901.)

THIS table will be welcome to students and teachers, for the existing charts are now quite out of date. To compile such is a laborious and somewhat thankless task, for it is impossible to please every one; indeed, the authors admit that in two respects, retaining the Permian in the Palæozoic and placing the Wealden in the Jurassic, they "seek to assert general rather than individual opinion." As to the former, the question seems to be largely one of locality; but in the latter we should have preferred the conservative side, at any rate till better cause is shown for the change; especially since it has led to the virtual suppression of the Neocomian as a system. For the same reason we are glad to see the Tremadoc group

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left in the Cambrian system. The latter they allow to be an important geological system, though we should have liked to see the alternative title, "Primordial Silurian," entirely suppressed, for it is commemorative of nothing less than an unwarrantable usurpation. The authors include the Solva Beds of St. Davids with the Meneyian, which no doubt is justified by the presence of Paradoxides; but in that case too small a thickness is assigned to the system, for this addition would make it at St. Davids over two thousand feet. Remembering its importance on the Continent, we should have ventured to exalt Rhætic, thin as it may be in Britain, to the dignity of a system, and we think that over much importance is conceded to the subdivisions of the Tertiary series. Are the Thanet Sands or the Oldhaven Beds—not to mention others—more important than the Lower Calcareous Grit or the Stonesfield Slate? Yet we find the former among Formations and the latter in Subdivisions. Does not the statement that the glacial deposits contain only derived fossils beg a disputed question? It would be well to add "slates" to the economic products of Charnwood, for the "honestone," which is mentioned, is very local. A notable feature is the recognition as formation of Torridonian, Uriconian, Dalradian and Lewisian in the Archaean rocks, though some objection may be taken to the third name, on the ground that as originally defined it was a much too heterogeneous assemblage, and we may doubt whether the Moine schists, having regard to their history, form a good type. These criticisms, however, affect only points of detail, and some may even regard them as excellences, while as to the general excellence of the table and its high value to students there cannot be the slightest question.

*Differential and Integral Calculus for Beginners.* By Edwin Edser, A.R.C.S. Pp. vi + 253. (London: Nelson and Sons, 1901.)

THIS is a book written to supply the wants of students in advanced physics who require some knowledge of the calculus to enable them to read treatises on physical science, but who have not time to devote to a thorough study of higher mathematics. It is the outcome of a series of articles printed some time ago in the pages of the *Practical Teacher*. Most of the text-books which have been written on the subject of the calculus treat it too fully, and deal with examples of too complex and difficult a character to be really suited to the needs of students, who chiefly want the calculus to enable them to understand the theory of comparatively simple experimental problems in mechanics and physics. The present little book is one of several that have been written in recent years with the object of supplying this want. The author has treated the subject in a very simple manner, and does not assume the reader to have more mathematical skill than is involved in a familiar knowledge of elementary algebra and geometry. The opening chapter deals with the elements of coordinate geometry, and explains the nature of the circular and exponential functions sufficiently to render it needless for the ordinary student to refer to other books. This is further ensured by the addition of an appendix dealing with trigonometrical ratios and formulae. Two chapters are spent on the differentiation of simple and complex functions, two others on maxima and minima and expansions, and two more on simple integrations by direct and special methods. This is followed by a section devoted to applications to problems in geometry, mechanics and, more especially, in physics. The final chapters deal with double and triple integration and simple differential equations.

In general the book is well written, and suitable for beginners. A good feature is the introduction of several numerical problems. The subject in this way is more vividly brought to the student's mind than when the examples, as is ordinarily the case, begin and end in

mere symbols. The analytical working out of problems is given with unusual fulness. On the whole this is a distinct advantage to the beginner, though in some cases it has been a little overdone, as, for instance, on pages 190-193, where more than  $2\frac{1}{2}$  pages are devoted to the analytical work of a triple integration. Each chapter contains several examples fully worked out, and concludes with a number of exercises to which the answers are appended.

The arrangement of the book is good, but the section dealing with real and imaginary quantities early in the book, and that on the hyperbolic functions towards the end, might have been omitted without much real loss to the beginner, and certainly the former section is introduced too early.

A mistake occurs on page 101 in reference to an application to alternating electrical currents. The arithmetical average has been confused with the square root of mean square, with the result that the statement made is incorrect.

*Engineering Chemistry.* A manual of Quantitative Chemical Analysis for the use of Students, Chemists and Engineers. Second Edition. By Thomas B. Stillman. Pp. 503. (Easton, Pa.: The Chemical Publishing Co., 1900.)

THIS work is intended to be placed in the hands of the student who is commencing quantitative analysis, and hence the first eleven exercises deal with general elementary determinations, after which he will take up that portion of the book which deals with his special requirements. Schemes are then given for the analysis of coal and coke, iron ores, water, both for sanitary and technical purposes, of coal, oil, producer and flue gases, iron and steel, cement, building materials, paper, soap, lubricating oils, paint and asphalt. On account of the wide scope of the book, the author has secured special articles from experts on blast furnace practice, boiler tests, carbon compounds of iron, practical photometry, electrical units and energy equivalents. As must necessarily be the case from the size of the book and the variety of subjects dealt with, the work is written in a very compressed style throughout, so much so, in fact, that it is scarcely a suitable work to put in the hands of "students commencing quantitative analysis." The large amount of practical information in it, however, will render it a useful work of reference for chemists engaged in engineering work. In some respects there is room for improvement. The superabundance of decimal places in numerical results, which is, unfortunately, characteristic of American technical literature, is very much in evidence. Thus in an analysis of water for technical purposes, the constituents of which, on account of their minuteness, are weighed with an accuracy of about two, or at the most three, significant figures, in the final statement of results no less than five places are given. An even more striking case is in the section on calorimetry, in which the water equivalent of a calorimeter is laboriously worked out to six significant figures, 203.460, the experimental result being casually given as 227.22. Another example is in the determination of the heating value of a gas, the result being expressed as 10726.7 B.T.U. per pound. The section on photometry is somewhat out of date, no mention being made of any standard of light other than the sperm candle. The chapter on pyrometry and many of the numerical data also require bringing up to date, many of the tables and calculations being based upon the weight of a litre of hydrogen taken as 0.08958. A noteworthy feature, and one adding considerably to the value of the book, is the introduction of a short bibliography at the end of each special chapter. It is curious to note that in some cases recent papers of importance are given as references, but ignored in the text. This is especially noticeable in the chapter on pyrometry.

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#### LETTERS TO THE EDITOR.

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#### Darwinism and Statecraft.

EVERY one who is interested in the bearing which the teaching of biology has to the affairs of the nation must have followed with interest not only this last work of Prof. Pearson, but also his many contributions to the subject of heredity. Very opportune, also, is Prof. Lankester's appeal in his review (March 21) to "the greatest in the land," for apart from the fact "that the crowd cannot guide itself in its blind impotence," it is being otherwise led by the hysterical nonsense of a halfpenny Press that is degrading journalism and the people by the substitution of bombastic ignorance and assertiveness for knowledge and real merit.

It seems to me that the statement in Prof. Pearson's book of what the British parent ought to say is just what he should not say, and that the implication in Prof. Perry's review that the development of the faculties ought to begin at the public schools is open to objection because such beginning can and ought to be made very much earlier. The statement which Prof. Pearson would have the parent say would be better if it were altered so that for "son" we should read "children," for surely we require thinking and observing daughters as well as sons; and, moreover, the statement seems to imply that the parent expects the public school or the University to teach his son to think and observe, whereas, if the parent did his duty, the most that he ought to expect of these institutions would be the further development of his children's thinking and observing powers, and not their initiation in these matters.

We need thinking men, it is true; but what is the nature and source of the early influences that makes or mars their careers before they will be brought into contact with the educational system that is to make them thinkers? Are we not on the wrong track when we talk of "making thinkers" or of "training men to think"? Remembering the nature of the child, rather it seems to me that we should be nearer a successful issue if we turned our energies in the direction of retaining and developing the thinking powers it naturally possesses. Any one who chooses to observe the development of a child's mind will, if he does not suppress its natural bent, convince himself that a child from three to five years of age possesses thinking powers of greater capacity than we are in the habit of crediting to it. One of the external evidences of a thoughtful mind is the asking of questions which bear definite and logical relations to each other; and this is precisely what an average child of that age, when talking to a person in sympathy with it, is persistently doing. It is not content with a flimsy and evasive answer, and how strong is its intellectual craving is manifested by its evident disappointment or display of temper when its ignorant parents impatiently curb its curiosity. It is very seldom that one finds a mother who has endeavoured to retain her child's thinking capacities. I was once present when the four-year-old little daughter of such a mother was making inquiries about the planet Venus, and after she had been informed that both Venus and the earth travelled round the sun and were illuminated by it she put the query, "Then if there were people on Venus our earth would look to them like Venus looks to us?" This question demonstrates that a child possesses thinking powers sufficiently vigorous to enable it to see the logical relationships of bodies to each other that would certainly do credit to many of its superiors in point of years. This is not an isolated instance, and my impression, derived from observation and from conversation with observant persons, is that the average child, if not suppressed, is capable of a quality of thinking that leads its elders, when they try to follow it, into an intellectual quagmire of inconsistency and absurdity from which they beat an inglorious retreat by angrily bidding it "not to ask silly questions." If they bid themselves not to give silly answers their request would be just. Let me give an instance of the intellectual stagnation upon which the children who will become the nation's men are being reared. I once heard a child ask its mother, "What makes the flowers grow?" Promptly came the answer, "Jesus!" No wonder when children's intellects are muddled with such unprovable assertions that they cease to think. I recall my